# NORTHWEST ACADEMY ASCENT (PWSNO 1110044)
# SOURCE WATER ASSESSMENT REPORT

**March 24, 2003**

## State of Idaho
## Department of Environmental Quality

## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Northwest Academy Ascent*, describes the public drinking water source; the recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

Northwest Academy Ascent operates a water system serving a population of 150 students and staff at a residential school 2 miles north of Naples in rural Boundary County, Idaho (Figure 1). A spring on the north side of Ruby Creek and near the bottom of the access road leading to the school supplies drinking water and water for fire suppression.

The spring is subject to surface water influence and is highly susceptible to naturally occurring microbial contamination. Filtration and chlorination purify the water before it enters the distribution system. Susceptibility to other classes of regulated contaminants is low because the watershed above the intake is undeveloped except for the school facilities.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For Northwest Academy Ascent, drinking water protection for the spring means protecting the watershed, particularly from activities that increase turbidity of the water. Because the springs are in a draw below the plateau where the school is located, any additions to the school's facilities, especially septic systems, should be built on sites as far from the head of the draw as possible. The school should review its policies for handling and storing potential contaminants that could leach into the groundwater feeding the springs.

# Source Water Assessment for Northwest Academy Ascent

## Section 1. Introduction - Basis for Assessment

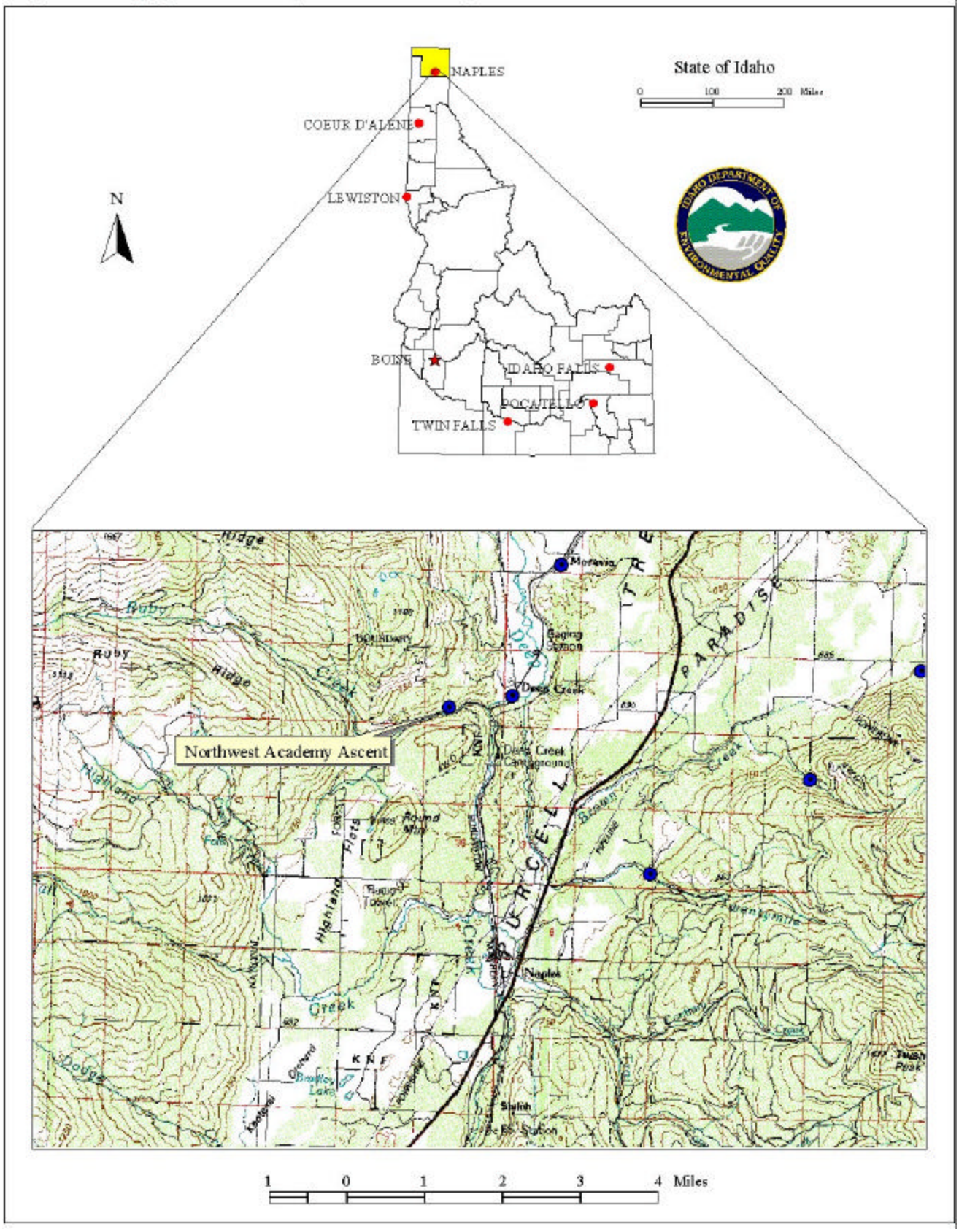
The following sections contain information necessary for understanding how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** Maps showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The water Susceptibility Analysis Worksheets used to develop this assessment is attached.

### Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

**The results of the source water assessment should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.** The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

*Figure 1. Geographic Location of Northwest Academy Ascent*



## Section 2. Preparing for the Assessment

### Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a water source that becomes the focal point of the assessment and source water protection activities. The recharge zones for springs were delineated like small watersheds upstream from the intake to the hydrologic boundary. The Northwest Academy Ascent spring delineation was drawn on a 7.5 minute U.S. Geological Survey Map by tracing the ridge lines that define the draw above the intake structure. The delineation encloses about 19 acres, terminating on a small plateau above the springs where the school facilities are located (Figure 2). Because of the volume of water the springs produce, it is likely that they are fed by infiltration of precipitation over a much larger area on the plateau and mountain sides north of Ruby Creek.

### Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of water contamination. Inventories for all public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources within a system's source water assessment area through the use of computer databases and Geographic Information System maps developed by DEQ. Maps showing the delineations and tables summarizing the results of the database search were then sent to system operators for review and correction during the second or enhanced phase of the inventory process.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

## Section 3. Susceptibility Analysis

The susceptibility to contamination of surface water sources in Idaho is being assessed on the following factors:

- physical integrity of the well or surface water intake,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The susceptibility analysis worksheet for the Northwest Academy Ascent spring in Attachment A shows in detail how the source scored.

### System Construction

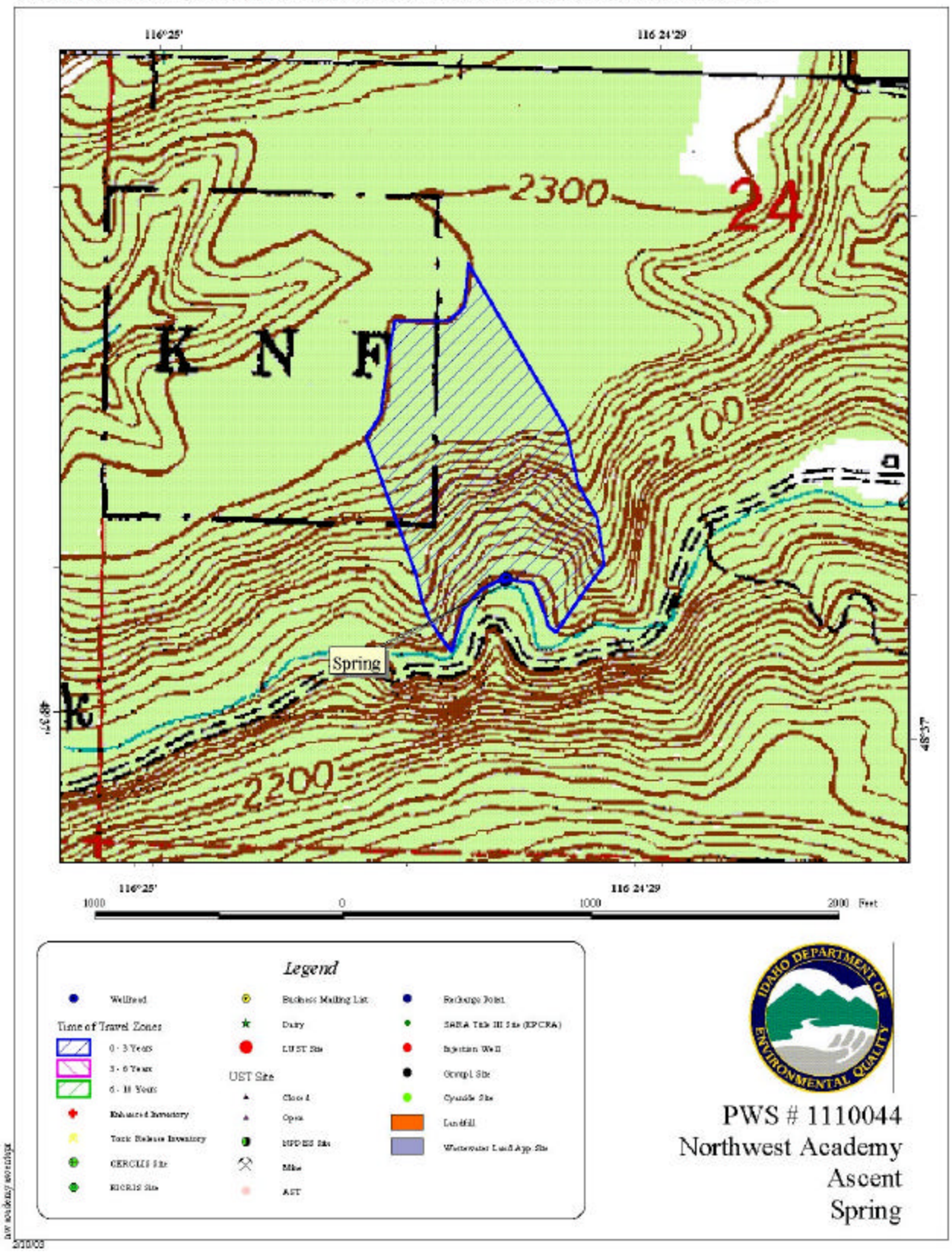
The construction of spring intakes affects their ability to remove debris and to provide some filtration prior to treatment. Sanitary surveys and engineering drawings provided information for this portion of the susceptibility analysis.

The Northwest Academy Ascent spring was developed in 1994 as the primary source of water for the school. The system formerly relied on an intake in Ruby Creek for drinking water and water for fire protection. The Ruby Creek intake reportedly remains connected to the raw water line leading to the filtration system, but is not used. The spring is at the base of a small, steep draw on the north side of Ruby Creek. 4-inch PVC collectors installed in an infiltration trench direct the flow into a stilling basin on the north side of the road leading up to the school. Water is then piped under the road to a pump station that raises the water to a slow sand filter. While surface water is diverted around the spring itself, the associated structures are not watertight.

### Potential Contaminant Sources and Land Use.

The spring is at the base of a steep wooded draw enclosing approximately 19 acres, but is probably fed by precipitation infiltrating a much larger area on the plateau and high slopes north of Ruby Creek. The school facilities are the only potential source of contaminants in the vicinity. The location of the school's sewage disposal system relative to the spring intake is not documented in the public drinking water system file for Northwest Academy Ascent. Road cuts and other land disturbances near the spring are a potential source of sediment that can reduce the efficiency of the treatment process.

*Figure 2. Northwest Academy Ascent Delineation and Potential Contaminant Inventory.*



## Historic Water Quality

Northwest Academy Ascent has had few water quality problems other than naturally occurring microbial contamination. Slow sand filtration and chlorination purify the spring water before it enters the distribution system. The trihalomethanes detected in the water in November 1995 are byproducts of disinfection. Di(2-Ethylhexyl)-Phthalate detected in the water in 1998 and 2001 is a plasticizer. Its presence in samples from the Northwest Academy Ascent spring was probably due to sampling technique error. The chemical was not detected in samples tested in September and December 2002. Chemical and radiological sampling results for the spring are summarized below.

### Table 1. Northwest Academy Ascent Chemical Test Results

| Primary IOC Contaminants (Mandatory Tests) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Contaminant | MCL (mg/l) | Results (mg/l) | Dates | Contaminant | MCL (mg/l) | Results (mg/l) | Dates |
| Antimony | 0.006 | ND | 11/14/95 through 6/20/02 | Nitrate | 10 | ND to 0.099 | 11/14/95 through 12/31/02 |
| Arsenic | 0.01 | ND | 11/14/95 through 6/20/02 | Nickel | N/A | ND | 11/14/95 through 6/20/02 |
| Barium | 2.0 | ND to 0.06 | 11/14/95 through 6/20/02 | Selenium | 0.05 | ND | 11/14/95 through 6/20/02 |
| Beryllium | 0.004 | ND | 11/14/95 through 6/20/02 | Sodium | N/A | 2.98 to 4.3 | 11/14/95 through 6/20/02 |
| Cadmium | 0.005 | ND | 11/14/95 through 6/20/02 | Thallium | 0.002 | ND | 11/14/95 through 6/20/02 |
| Chromium | 0.1 | ND | 11/14/95 through 6/20/02 | Cyanide | 0.02 | ND | 11/14/95 |
| Mercury | 0.002 | ND | 11/14/95 through 6/20/02 | Fluoride | 4.0 | ND to 0.3 | 11/14/95 through 6/20/02 |

| Secondary and Other IOC Contaminants (Optional Tests) | | | |
|---|---|---|---|
| Contaminant | Recommended Maximum (mg/l) | Results | Dates |
| Sulfate | | 5.3 to 6.1 mg/l | 5/28/97 through 6/20/02 |

| Regulated and Unregulated Synthetic Organic Chemicals | | |
|---|---|---|
| Contaminant | Results | Dates |
| 29 Regulated and 13 Unregulated Synthetic Organic Compounds | None Detected except as noted below | 12/20/95, 5/28/97, 8/25/98, 3/9/01, 9/12/02 |
| Di(2-Ethylhexyl) – Phthalate (MCL = 6.0 µg/l) | 6.10 µg/l, 0.9 µg/l<br>ND | 3/9/01, 8/25/98<br>12/6/02, 9/12/02 |

| Regulated and Unregulated Volatile Organic Chemicals | | |
|---|---|---|
| Contaminant | Results | Dates |
| 21 Regulated And 16 Unregulated Volatile Organic Compounds | None Detected except as noted below | 11/2/94, 4/18/00, 9/25/01 |
| Total Trihalomethanes (MCL = 100 µg/l) | 63.33µg/l<br>ND | 11/14/95<br>5/28/97 through 3/9/01 |

**Table 1. Northwest Academy Ascent Test Results continued**

| Radiological Contaminants Spring and Distribution system samples | | | |
|---|---|---|---|
| Contaminant | MCL | Results | Dates |
| Gross Alpha, Including Ra & U | 15 pCi/l | 0.7 to 2.0 pCi/l | 11/14/95 through 4/26/01 |
| Gross Beta Particle Activity | 4 mrem/year<br>50 pCi/l | 1.8, 2.5 mrem<br>2.3pCi/l | 11/14/95, 12/17/96<br>4/26/01 |

## Final Susceptibility Ranking

The Northwest Academy Ascent spring, like all water sources subject to surface water influence, is highly susceptible to microbial contamination. The susceptibility of the spring to other types of contaminants is low. School facilities on the flat above the spring are the only potential source of contaminants in the watershed.

Totals for system construction and hydrologic sensitivity along with the cumulative scores for land use and potential contaminant sites are shown on Table 2. A complete susceptibility analysis worksheet for the Northwest Academy Ascent spring is in Attachment A.

For surface water sources, the final susceptibility score is the sum of the source construction score and the potential contaminant/land use score. The susceptibility ranking is low for sources with final scores from 0 to 7; moderate for sources scoring 8 to 15 points; and high when scores range from 16 to 21.

**Table 2. Summary of Northwest Academy Ascent Susceptibility Evaluation**

| Cumulative Susceptibility Scores | | | | | |
|---|---|---|---|---|---|
| **Source Name** | System Construction | Contaminant Inventory | | | |
| | | IOC | VOC | SOC | Microbial |
| Spring | 1 | 5 | 5 | 5 | High |
| **Final Susceptibility Scores/Ranking** | | | | | |
| | IOC | VOC | SOC | Microbial | |
| Spring | 6/Low | 6/Low | 6/Low | High | |

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

# Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

In order to protect the quality of water from the springs, the school should locate new buildings, septic systems and so on as far as possible from the head of the draw where the springs are located. It might be useful to review the facilities management plan pertaining to storage of potential contaminants like petroleum products, solvents, paints and cleaning products, and chemicals used for maintenance of the school grounds. Accidental spills or improper disposal of these products could contaminate the ground water feeding the springs. Although the school's water comes from a spring rather than a well, it should look into a program like Home*A*Syst or Farm*A*Syst. These programs focus on assessing everyday activities for their potential for ground water contamination. They cover subjects like septic system maintenance, proper use and storage of household hazardous materials, vehicle maintenance and other activities associated with running a large facility.

Hatches into the stilling basing and pump station should be watertight and secured against vandalism. Preventing turbidity due to surface water runoff or human activity in the watershed should be another goal of drinking water protection efforts for the school. Periodic inspections of the watershed to monitor changes due to human activity or natural processes need to be part of the protection program. Due to the fairly short time associated with the movement of water in a small, steep watershed, source water protection activities should be aimed at both short-term and long-term management strategies to counter future contamination threats. Source water protection activities should be coordinated with the U.S. Forest Service, and any private landowners in the watershed.

A voluntary measure every system should implement is development of a water emergency response plan. There is a simple fill-in-the-blanks form available on the DEQ website to guide systems through the process.

## Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Idaho Department of Environmental Quality

| | |
|---|---|
| Coeur d'Alene Regional IDEQ Office | (208) 769-1422 |
| State IDEQ Office, Boise | (208) 373-0502 |
| Website: | http://www.deq.state.id.us |

Idaho Rural Water Association

| | |
|---|---|
| Melinda Harper, Groundwater Protection Specialist | (800) 962-3257 |
| Website: | http://www.idahoruralwater.com |

Idaho Association of Soil Conservation Districts

| | |
|---|---|
| Water quality and soil conservation | (208) 338-5900 |
| Website: | http://www.iascd.state.id.us/ |

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## References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Haitjema, Henk. 2000. Time of Travel Capture Zone Delineations for Wellhead Protection. Prepared for Drinking Water Branch, Indiana Department of Environmental Management. Environmental Science Research Center, Indiana University, Bloomington, Indiana

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

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# Attachment A

# Northwest Academy Ascent
# Susceptibility Analysis Worksheet

# Surface Water Susceptibility Report

Public Water System Name : **NORTHWEST ACADEMY ASCENT** Source: **SPRING**

Public Water System Number : **1110044**

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| **1. System Construction** | | **Score** |
|---|---|---|
| Intake structure properly constructed | Allows entrance of surface water | 1 |
| Infiltration gallery | YES | 0 |
| ***Total System Construction Score*** | | **1** |

| **2. Potential Contaminant Source / Land Use** | | **IOC Score** | **VOC Score** | **SOC Score** | **Microbial Score** |
|---|---|---|---|---|---|
| Predominant land use type (land use or cover) | RESIDENTIAL SCHOOL | 2 | 2 | 2 | 2 |
| Farm chemical use high | NO | 0 | 0 | 0 | |
| Significant contaminant sources within 500 feet of spring | Naturally occurring microbial contaminants | 0 | 0 | 0 | *High |
| Sources of class II or III contaminants or microbials | NO | 1 | 1 | 1 | 1 |
| Agricultural lands within 500 feet | NO | | | | |
| | | 0 | 0 | 0 | 0 |
| Contaminant sources in watershed but more than 500' from spring | YES | 1 | 1 | 1 | 1 |
| Sources of turbidity in the watershed | YES | 1 | 1 | 1 | 1 |
| ***Total Potential Contaminant Source / Land Use Score*** | | **5** | **5** | **5** | **5** |
| **3. Final Susceptibility Source Score** | | **6** | **6** | **6** | **6** |
| **4. Final Source Ranking** | | Low | Low | Low | *High |

# POTENTIAL CONTAMINANT INVENTORY
## List of Acronyms and Definitions

**AST (Aboveground Storage Tanks) –** Sites with aboveground storage tanks.

**Business Mailing List –** This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS –** This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ? Superfund? is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site –** DEQ permitted and known historical sites/facilities using cyanide.

**Dairy –** Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well –** Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain –** This is a coverage of the 100year floodplains.

**Group 1 Sites –** These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area –** Priority one areas where greater than 25% of the wells/spring show constituents higher than primary standards or other health standards.

**Landfill –** Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area –** Area where greater than 25% of wells/spring show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System) –** Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas –** These are any areas where greater than 25 % of wells/spring show levels greater than 1% of the primary standard or other health standards.

**Recharge Point –** This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS –** Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) –** These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank) –** Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads –** These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.